CLAIMS

A radiator for a vehicle, comprising:

2	an inlet header;
	an outlet header;
4	a soldered core with a core length "h" and a core depth "t", said core
	having
6	a plurality of coolant flat tubes joining said inlet header and said

1.

8

10

12

2

4

6

outlet header, and cooling fins on opposite sides of said coolant flat tubes; and a multifunction flat tube on one side of said core and having a greater section modulus (Wx, Wy) than said coolant flat tubes, said multifunction flat tube being soldered to adjacent cooling fins and said inlet and outlet headers whereby said multifunction flat tube carries coolant from said inlet header to said outlet header.

2. The radiator of claim 1, further comprising a second multifunction flat tube on the opposite side of said core and soldered to adjacent cooling fins and said inlet and outlet headers whereby said second multifunction flat tube carries coolant from said inlet header to said outlet header, said second multifunction flat tube having a greater section modulus (Wx, Wy) than said coolant flat tubes.

	 The radiator of claim 1, wherein said radiator is a
2	downdraft radiator with said inlet header on top and said outlet header on the
	bottom, and said inlet and outlet headers include
4	a plurality of openings each of which receives an end of one of said
	coolant flat tubes, and
6	an end opening receiving an end of said multifunction flat tube, said end
	opening being larger than each of said plurality of openings.

4. The radiator of claim 1, wherein said multifunction flat tube has substantially the same length "h" and depth "t" as said core.

2

2

4

- 5. The radiator of claim 1, wherein said multifunction flat tube is formed by one of soldering and welding.
- 6. The radiator of claim 1, wherein said multifunction flat tube includes walls extending the depth of said core, said tube walls being deformed along their length between said inlet and outlet headers to define separate coolant passages.
- The radiator of claim 1, wherein said multifunction flat tube
 includes flat walls extending the depth of said core, and further comprising an insert between said flat walls of said multifunction flat tube, said insert defining coolant passages through said multifunction flat tube between said inlet and outlet headers.

8. The radiator of claim 1, wherein said multifunction flat tube includes flat walls extending the depth of said core with inward directed protrusions, said protrusions being connected to each other.

2

2

4

2

2

2

- 9. The radiator of claim 1, wherein the inner flow resistance of the multifunction flat tube is substantially smaller than the inner flow resistance of said coolant flat tubes.
- 10. The radiator of claim 1, wherein said multifunction flat tube has a wall thickness substantially greater than the wall thickness of said coolant flat tubes and a tube height substantially greater than the height of said coolant flat tubes.
- 11. The radiator of claim 10, wherein said multifunction flat tube wall thickness is at least two times the wall thickness of said coolant flat tubes.
 - 12. The radiator of claim 11, wherein said multifunction flat tube wall thickness is at least about 1.0 mm.
 - 13. The radiator of claim 10, wherein the height of said multifunction flat tube is at least two times the height of said coolant flat tubes.
- 14. The radiator of claim 13, wherein the height of saidmultifunction flat tube is at least about 10 mm.

	15.	The radiator of claim 1, wherein said flat tubes extend		
2	generally vertically	with said inlet header soldered to the upper ends of said flat		
	tubes, and further comprising:			
4	a partition ir	n said inlet header defining first and second chambers, said		
	first (chamber being above said multifunction flat tube and said		
6	seco	nd chamber being above said coolant flat tubes; and		
	a filling line	between a coolant fill supply and said first chamber for		
8	addii	ng coolant to said radiator.		
	16.	The radiator of claim 15, wherein said filling line slopes		
2	down from the coo	lant fill supply to the first chamber.		
	17.	A radiator for a vehicle, comprising:		
2	an inlet header;			
	an outlet he	eader;		
4	a soldered	core having a plurality of coolant flat tubes joining said inlet		
	head	ler and said outlet header, and cooling fins on opposite sides		
6	of sa	aid coolant flat tubes; and		
	a multifunc	tion flat tube		
8	whic	h is soldered to adjacent cooling fins on one side of said		
		core and to said inlet and outlet headers whereby said		
10		multifunction flat tube carries coolant from said inlet		
		header to said outlet header, and		
12	havi	ng an inner flow resistance which is substantially smaller		
		than the inner flow resistance of said coolant flat tubes		
14		whereby more coolant flows through said multifunction flat		

16

2

4

6

8

2

4

tube than flows through an individual coolant flat tube per unit time to influence temperature distribution over the entire radiator.

- 18. The radiator of claim 17, further comprising a second multifunction flat tube on the opposite side of said core and soldered to adjacent cooling fins and said inlet and outlet headers whereby said second multifunction flat tube carries coolant from said inlet header to said outlet header, said second multifunction flat tube having an inner flow resistance which is substantially smaller than the inner flow resistance of said coolant flat tubes whereby more coolant flows through said second multifunction flat tube than flows through an individual coolant flat tube per unit time to influence temperature distribution over the entire radiator.
 - 19. The radiator of claim 17, wherein said radiator is a downdraft radiator with said inlet header on top and said outlet header on the bottom, and said inlet and outlet headers include
 - a plurality of openings each of which receives an end of one of said coolant flat tubes, and
- an end opening receiving an end of said multifunction flat tube, said end opening being larger than each of said plurality of openings.